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LATE-OTTOMAN ARCHITECTS AND MASTER BUILDERS

In the last three decades a fair amount of scholarly research on the architects and master builders of the Ottoman period has been published, but unfortunately it has been forced into the mold of "national" boundaries as they are perceived today, and this has played havoc with the reality of the fundamentally homogeneous Ottoman urban culture, multiethnic though it may have been. In addition, Ottoman registers, statements by the architects themselves, and the structure of the corporations, however meticulously analyzed, throw little or no light on how Ottoman designers and builders worked and conceived their work. As a result the monographic and certainly valuable scholarship that has developed in various countries on the Ottomans needs interpretation, a change of emphasis, and ultimately confrontation with the structural and linguistic analysis of the architectural works themselves.

In Ottoman urban culture two distinct crafts—that of the architect¹ and that of the master builder (*maistores* in Macedonia and Epirus, *kalfa* in Anatolia and sometimes in Bulgaria)—shared the responsibilities for the design and construction of all kinds of structures. Of the two, the architect was apt to be the more cultured and better integrated into official institutions; the master builder belonged to a socially broader sphere. But it was not so much their tasks as their participation in well-defined organizations (the architects in the state's or the sultan's institutions and the master builders in the corporations) that established their affiliation.

The evolution of social and political conditions in towns brought about a change in the definition and relationship between the two professions beginning in the sixteenth century. In the classical period *kalfa* (from *halife* or in Arab *khalifa*, "vicar," "helper") referred simply to an artisan who helped the architect, but by the eighteenth and nineteenth centuries master builders were often called upon to assume full responsibility for

public buildings, though their works for private clients continued to outnumber their public projects.

The architect was a technician involved in the design of military and hydraulic-engineering devices. Although he was no mere artisan, he was also not the Ottoman intellectual described by Mantran,² who attained the rank of qadi or gained some other state employment at the age of forty or more after long medrese schooling; nor does he seem to have belonged to the elite that furnished the state with high officials and intellectuals. He seems to have come from the army or from the building guilds; either could provide him with practical schooling that furnished a flexible mind and few career ties. His links with power were there, but they were tenuous and subtle, and not so dangerously involved as those in the intellectual and bureaucratic categories.³ The lower his social standing, the less his dependence on others. At the lowest level, no longer architect but master builder, he could join a free itinerant guild.

THE HAS MIMAR SYSTEM AND ITS DECLINE

The centralized *has* or *hassa* (sultan's property and service) system of recruitment and organization and the design methods used by it up to the end of the seventeenth century had allowed a small number of architects to control all the important imperial and most *vakıf* building sites over the vast territories of the empire. During Sinan's reign as chief imperial architect through the second half of the sixteenth century, the *has* workshop of architects attained an articulate and surprisingly efficient degree of organization. Between forty and seventy architects produced designs for a very large labor force, directed the construction of military and civil buildings, water and road facilities, and ephemeral constructions for feasts and ceremonies from Budapest to Cairo. All these works bore the trademark of the new imperial style, though not all were of the same high caliber. Sinan's prestige

was such that all projects were attributed directly to him, but he could certainly not have been everywhere. To the very end of the *has* system in the nineteenth century, it was common practice in the sultan's workshop for the head architect to take all the credit or blame.

The workshop was organized as an *ocak* (literally "hearth," but variously translated as "club," "college," or, when it was part of the imperial Janissary troops, as in this case, "corps"). In military campaigns, the *has* architects built forts, earthworks, and light bridges. Its main body was probably quartered in or near the imperial palace, but some workshops, such as that of the apprentices, were stationed elsewhere. Much has been written on that organization.⁴ We can infer that it had a strong hierarchy (not exempt from intrigue and court politics) with a centralized structure and a professional *esprit d'atelier* rather than a military *esprit de corps*. Even under Süleyman the Magnificent, it could not rely on unlimited financial resources, but it could put pressure on the other levels of state structure to obtain materials and manpower. Christians were members—and not as Islamicized *devşirme*. At first they were few, but later the number increased, proving that it was somehow an open institution and not a strictly military one.

In the eighteenth century the empire was opened to Western influence. In 1796 Selim II had inaugurated an engineering school, but it did not have a section for the teaching of architecture before 1882.⁵ His and his successors' reforms touched the *has* system only indirectly, though their particular brand of Ottoman reformism affected the architect's social position and his cultural role. Intellectuals had been free to question the causes of Ottoman decline since classical times, but they had to deduce their conclusions from authorized and orthodox sources. In that respect, the Ottoman court and the circles around the Phanariot Greek patriarchate were fairly similar. No utopian or revolutionary thought was conceivable in that milieu. The cellular conception⁶ of the town structure, the dependence on the *vakıf* system, and the spiritual and cultural basis of monumental architecture—in other words, all that determined the Ottoman town's specificity—were never questioned. On the other hand, architecture as a practical activity, as building in and of itself, was not constrained, because its methods were not deductive and did not need theoretical justification. To the contrary, the general awareness that technological reform was to be desired but that the

social, ideological, and political bases of the Ottoman system could not be questioned allowed architectural style to change all too freely, to the point of losing its roots. In the last decades of Ottoman urban culture, mosque and church types remained almost unchanged, but style and ornament and the rules of composition underwent profound changes. Unlike military, political, and educational activities, architecture, along with the crafts and the minor arts, was not regarded as worth reforming, despite its past prestige, nor, on the other hand, was it maintained within the bounds of tradition, as were music, literature, and theology. The reforming Sultan Selim III and many modernist intellectuals, not least the Greek intellectuals of Constantinople,⁷ in private remained deeply dedicated to the Oriental aesthetic and emotional ideals in literature and music, but hardly in architecture. This explains why the proposal to reform the *has* school of architecture submitted by the last chief architect was ignored. The government preferred to establish the Imperial Intendency for Building when the *has* atelier was abolished, giving free hand to foreign and foreign-trained Ottoman architects.

We must look elsewhere than the Ottoman architectural elite to find works that preserve Balkan-Ottoman space and typology, even under the heterogeneous influences that dominated the post-eighteenth-century scene. Creative functions had been transferred, not only to foreign architects, but also to the master builders. Bernard Lewis⁸ holds that the decline of Ottoman culture at the beginning of the nineteenth century was restricted to court culture; popular culture continued to retain its vitality for many decades. In the towns the master builders were the symbol of that vitality.

It is significant that a profession intermediate between imperial architect and master mason existed and was officially recognized beginning in late classical times. This was the "town architect," nominated by the chief *has* architect to oversee imperial building sites and to supervise all construction activity whether private, *vakıf* or imperial, in provincial towns. The town architect's first appearance signaled a change in the relations between the centralized system and local culture.⁹ Town growth had been constant from the second half of the sixteenth century to the end of the seventeenth, and the increased building that resulted from commerce and a rising standard of living of the middle class, could no longer be directly overseen by

the *hassa* architects. Local architects had already had some responsibility in the design and maintenance of *vakıf* works,¹⁰ but the first appointment of a town architect dates from 1627, and the office became common only after the mid-seventeenth century.

Master-builder guilds, itinerant and sedentary, had existed even before the sixteenth century, but they did not undertake design and construction work in towns until the late seventeenth century, when the growing town population, both Muslim and Christian, began to prosper.

The heyday of Balkan mason corporations started in the late eighteenth century in the western parts of the peninsula during the Albanian *paşalık*.¹¹ The Albanian area in the seventeenth and eighteenth centuries and northern Macedonia in the late eighteenth and in the nineteenth century gave Ottoman culture whole dynasties of master builders who designed public as well as private buildings in Albania, Epirus, and northern Macedonia. One of them was the Damianov family, who were builders of clocktowers, konaks, houses, churches, and mosques in the principal Macedonian towns. In the same period the Bulgarian lands also had important companies such as that of the Ficev family. All of them were organized as traveling confraternities of masons and carpenters, often belonging to the same family, town, or village. In more than one case, the family or village corporations called *taife* or *bölük* (brigades) had a secret language which extended from building nomenclature to everyday terms. The best-known companies worked over a vast territory, even as far as Cairo.¹²

How were the itinerant groups formed? Were there too many craftsmen in certain areas so that some were obliged to seek work outside their region? Were they mainly groups stemming from mountain regions (western Balkans, Cappadocia, and Syria), where particular building techniques had been maintained through the Middle Ages and perhaps since classical antiquity? Before the eighteenth century were these craftsmen mere executors, or were they also "contractors" and designers for their middle-class clientele? In the present state of research, we can only assume that a private client was a rarity until the seventeenth century and that the economic expansion of towns and the emergence of complex house types, the widespread use of light wood frames, fast and cheap but involving technological expertise, must have called for greater skill in the design of houses and of mahalle mosques and churches.

SYNCRETISM AND UNITY: CHRISTIAN AND MUSLIM, TOWN AND VILLAGE

Although most masters were illiterate,¹³ thanks to their openness to foreign influence (Italian in Epirus and Central European in Macedonia and Bulgaria) and to their instinctive loyalty to traditional culture, they contributed to the stylistic and linguistic unification of the building types of the Ottoman town, despite regional vernacular differences. Renovation came without typological and semantic degradation, because these builders did not adopt the foreign lexicon wholesale, but used it solely for layout and the spatial objectives common to the entire western nucleus of the empire.

Ottoman architecture as an original contribution can ultimately be defined only at the level of semantics, for its particular spatial feeling and its sense of structure, all of which were original despite many borrowings from other sources. Up to the very end of the eighteenth century, monumental and imperial architecture and up to the fifties and sixties of the nineteenth century minor architecture were part of a great urban civilization that formed a recognizable, long-lived, and meaningful entity from Bosnia to Syria. Regional differences were perceivable, but that part of the way of life that affects environment and architecture was overwhelmingly unitarian. So long as that unity was maintained, the concept of cultural decline can not help us unreel Ariadne's thread in the apparent labyrinth of the contradictory evolution of Ottoman art, because—I feel it must be emphasized—it had *always* been eclectic art from Sinan to Mehmet Tahir through Simyon Kalfa.¹⁴

The overall unity of Ottoman urban culture was accentuated by the recourse to (and fusion of) distinct regional techniques in the building trades and by the cooperation of craftsmen and masters of various origin. Masons, stonecutters, and carpenters of the classical-period worksites had come from the large Anatolian and Balkan towns where they had presumably settled earlier. Stonecutters often came from Kayseri, Konya, and some Aegean islands, carpenters from the Balkans, the Pontus area, the wooded regions of Macedonia and Anatolia. On construction sites, Turkish, Greek, Rhodopean, and Pontus carpenters, Albanian, Armenian, and Aegean masons, Arab and Turkish chisellers, Albanian and Walachian hydraulic craftsmen worked side by side. Some craftsmen came from the Central Asian areas that had a tradition of woodcarving and carpentry.¹⁵

It is a paradox of Ottoman civilization—centered in

towns and dominated by towns—that its architectural culture should have been almost entirely produced by villagers. Few of the more famous master builders were born or raised in towns. We do not have a clear image of the relationship of the so-called traveling corporations to the builders' corporations in towns. Evliya names dozens of Istanbul *esnaf* connected with the building trades, but Todorov for the Balkans and Faruqi for Anatolia, in their work on Ottoman town registers, rarely came across builders.¹⁶ The specialization of certain villages to serve the large towns, a characteristic trait of Ottoman urban civilization, brings up more questions than can be answered here. How independent from urban traditions were these village-based groups? To what extent did they reinterpret existing urban building types, and to what extent did they reintroduce in towns residual forms of Byzantine and even Roman building art that had survived in archaic and isolated regions? Finally, what caused the town building guilds to lose their dynamism?

Another aspect of this syncretism was the ease with which these builders borrowed technique and style from other cultures. As military engineers the *hassa* architects were empirists. They were willing to learn from the enemy, from the many European craftsmen and engineers employed in the Ottoman army;¹⁷ they could easily adapt the techniques of the military for the civilian use, as both kinds of projects, military and civilian, were carried out in the same workshop by the same professionals and workmen. The multiethnic and multiregional composition of the skilled labor recruited for the important building sites also favored the exchange of styles, techniques, and skill, and perhaps even typological concepts. In the long run, this too stimulated the syncretism that characterized Ottoman culture in the eighteenth and the first half of the nineteenth century. Christian religious architecture freely borrowed from the Islamic Ottoman architectural lexicon and technology. Christian master builders designed mosques as well as churches, with some ineffective opposition from the clergy.¹⁸

Although, until the time of the first Armenian chief architect Kirkor Balyan at the end of the eighteenth century, the chief architects had always been born or converted Muslims, the syncretism of Turkish-Islamic and Greek-Orthodox cultures had been developing since the beginning. The state and social apparatus of the Ottoman Empire was gradually secularized. In the Ottoman context this meant a transition, not so much from theocratic to civilian, as from military to civilian.

In the late eighteenth century *has* architects were rarely involved in military construction, and a growing number of Ottoman Christians were recruited. In the *has* organization of the classical period as many as 40 percent of the architects were Christians, but in the Nur-u-Osmaniye (1748-54) site nearly 80 percent of the masons as well as (apparently) the designing architect were *zimmi* (Turkish for *dhimmi*). In the classical period Muslim masters (Turks, Persians, Central Asians) were responsible for most of the work that required refinement and taste; most stone cutters were Muslim.¹⁹

Christians had been present even in Sinan's day, but in subordinate positions. This does not necessarily mean that Balkan Christian masters were not "masters of the art," but more plausibly that they had not reached a sufficient understanding of Ottoman imperial art. Even in Epirus, where stone masonry was an old tradition, they would revert to the non-Ottoman style, as is apparent in Master Manol's seventeenth-century Arta bridge.²⁰ In that phase, those who could master the new imperial architecture were Turks, Arabs, and Armenians who came from eastern Anatolia and Syria. Later the architectural *koiné* with its new accents called for architects and master builders who could combine French and Central European Rococo (a bourgeois Rococo, not the refined Louis XV style) with deep-rooted Ottoman views of architecture and the environment. They were understandably residents of the capital and of the Balkan regions.

This brought about a change in the mix of the ethnic and religious components of the building trades, and facilitated the assimilation of Western contributions, but it certainly did not mean the abdication of internal elements in favor of external ones. Abdication came later, in the first decades of the nineteenth century when the imperial court patronized foreign architects or chose foreign-trained Ottomans (mostly Armenians) who produced clumsy imitations of European styles and types.²¹ Decades later, in some regions even a century later, the rejection of Ottoman culture spread to the middle classes. In the meantime the last drop of innovation was squeezed out of the Ottoman house and market (*çarşı*) buildings in Anatolia, Macedonia, and Bulgaria.

Another apparent paradox of late Ottoman culture was that to the very end of the Ottoman state, the master builders maintained a precarious but culturally lively equilibrium between the Ottoman spirit and innovation both in the western Balkans and in eastern

Anatolia. Some Turkish, Slavic, and Greek masters using Western idioms extended the frontiers of Ottoman architectural types and helped them to survive change. (The Filibe-Plovdiv symmetrical house is one of the best examples.) In the nineteenth century active small towns like Safranbolu and Kütahya in Anatolia could be quite open to the synthesis of Western and Ottoman architectural ideas. New and cheerfully frescoed mosques were being built in Samokov, Debar, and as far east as Yozgat.

We might even say that, thanks to the master builders, Ottoman town architecture penetrated into some resistant areas long after the Ottoman political system had lost its hold. Every province, even the easternmost ones, maintained an unstable equilibrium between Western influences and local or traditional modes. All Western influences, invariably imported from Istanbul, had somehow first been Ottomanized; direct importation was rare even in the westernmost provinces until the Tanzimat reforms in the 1830's. The ruling elite, whether local or government-appointed, assumed a leading role in establishing taste, and it always looked to the capital.

The turning point, when each region emancipated itself from Ottoman culture and looked directly to Europe, came later in architecture than it did in the social and political spheres. Even after Serbia and Bulgaria had acquired a certain degree of administrative autonomy and were actively trading with Central Europe, housing and community buildings were still being constructed in an Ottoman spirit and in a very creative way. Earlier and in Anatolia, the mosque of Hizir Bey of Soma (1770) and in Yozgat the mosque of Bascavusoglu (1801), thanks to the simple and unitarian conception of their inner space, to naturalistic frescoes, to galleries poised on columns with classical capitals, reveal European-oriented typological factors common to other tekkes and Orthodox monasteries in the nineteenth-century Balkans.²² But other areas were so conservative as to refuse not only the western European idiom but also that of Istanbul, and reverted to the simple geometry of the Bursa style. This happened in Bosnia and provincial Macedonia as well as in some areas of Anatolia, in mosques as well as in convents.²³ The towns of Bosnia and Kosovo, lying only a few hundred miles from Austria-Hungary, kept to the fundamental concepts of the earlier Ottoman town and architecture. Despite the Dalmatian-Mediterranean (and ultimately Italian) sense of proportion in façade and plan, walled street

fronts and middle-class houses strictly divided into *harem* and *selamlık* were common in the nineteenth century, after they had disappeared elsewhere.

It would be perhaps truer to assert that the innovations originating in Istanbul penetrated more easily along the most important routes and in the liveliest urban system than it would be to say that Anatolia was generally more conservative than the Balkans. Innovation and conservatism were not a matter of religion or nationality, but of school and taste and of contact with the capital.

METHODS OF DESIGN AND ORGANIZATION

The Ottoman architect is reminiscent of such late-Roman architects as Apollodorus of Damascus, who earned his architect's grades after long service as a military technician for the emperor. In later periods other technical projects, mainly hydraulic works (aqueducts, pools, fountains, reservoirs), took the place of military building. The chief *hassa* architect had always first been a vice-chief-architect (*mimar-i-sanî*) responsible for all hydraulic engineering. We can say that Ottoman society, at least where it was concerned with architecture, had kept very close to the conception of classical antiquity that art was manufacture (*tekhne*); but architects could not be confused with political and financial superintendents as they were in Greek chronicles and registers. At an Ottoman building site of any importance, the architect was easily distinguished from both the mason and the overseer because of the clear division of labor.

Artisans executed the architect's design. Craftsmanship was subordinate in quality and semantic dislocation to the overall project. In Turkish as in Armenian Anatolia, iconoclasm in art resulted not so much in artistic expression turning to geometric and abstract ornamentation as in clearcut figures of architectural elements assuming symbolic significance and even transcendental poignancy. Ornament was appreciated, but it was not essential. The art of architecture thereby achieved social importance, and developed techniques and a syntax that enhanced expression through the conventional vocabulary of simple current building forms.

Financial and administrative supervision carried out by the *bina nazırı* (the representative of the patron in important works) and by the *bina emini* (the overseer for organization and expenditure) were separate from technical control. In large building sites, a small permanent nucleus of architects, aided by an impressive

administrative staff and by master masons, unified a very large but temporarily recruited skilled labor force. Sinan's Süleymaniye building site has been examined in Ömer Lütü Barkan's masterly study;²⁴ the construction started in 1550 and was completed in 1558, but the building site was active only in some of those years. Organization was flexible. Registers and correspondence between the responsible officers and various state officials show that the various stages of construction were concentrated into given times, that materials and labor were required only in certain periods, and that laborers were taken off the payroll and allowed to work for private citizens when they were not needed. Recent studies on the Nur-u-Osmaniye mosque have shown that organizational competence and speed were maintained in later periods too.²⁵

This efficiency required more than careful programming of construction: it meant precision of design both in layout (overall dimensions and tracing) and detailing (stonecutting, ornamental parts, etc.), surveying skill, and—in the specific context of the Ottoman architectural vocabulary—the large-scale production of repeated building elements. In this the tradition of stereotomy so characteristic of south and eastern Anatolia, Armenia, Syria, and the Adriatic coast, but neglected by the Byzantines, was invaluable. Architects had to be simple in the articulation of the single parts of their project when commissioning the amount and shape of elements to a large number of craftsmen. Ornament and molding of walls and other building elements had to be fairly definite and measurable before assembly.²⁶ Craftsmen (stone masons, carpenters) were required to be precise rather than brilliant or expressive; architects had to keep close to a design that only they could have in mind. They were expected to be conceptually clear and pay attention to typology rather than to display the gifts of improvisation and of lyrical fusion of elements. In that context, measurement and representation, and not necessarily fine rendering as it was understood in Europe, were linked and were of primary importance.

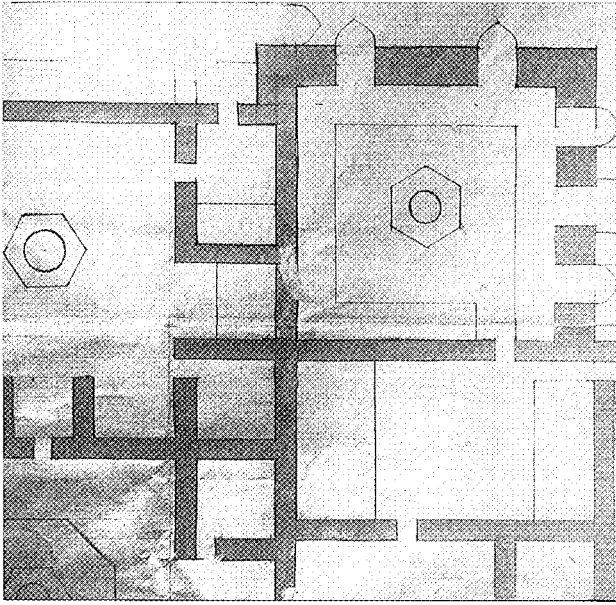
The system of measurement was sophisticated. The architect's *arşın*, like the old English yard, was both an instrument and a standard unit of 757 mm. It divided into 24 *parmak* (fingers = inches of 31.5 mm.), then into 288 *hat* (line, 2.6 mm.), then again into 3,456 *nokta* (point, 0.22 mm.). The ratio between the units was 1:24:12:12.²⁷ This resulted in a system easily adaptable both to construction techniques and to the spatial conception of the Ottomans. It allowed the display of the

minute and meticulous ornamentation of the auxiliary crafts, the medium and small, repeated modules of wood-frame construction, and the large and medium dimensions of the stonecutter's stereotomy. The unit and scale of measurement appropriate to each technique had to be combined within layouts which could be very complex but could always be reduced to few and easily traceable geometric units.

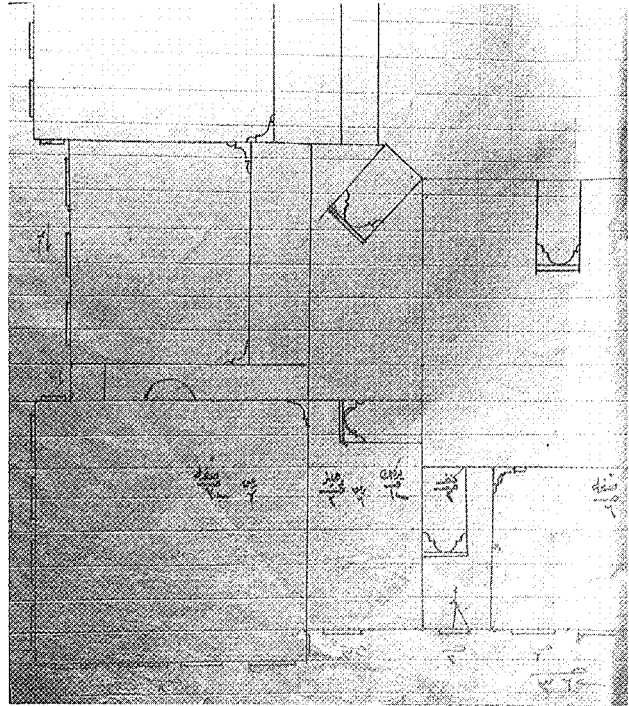
It is no mere coincidence that treatises such as that of Cafer Ağa should contain a whole section on proportions (*oran*). The refined system of measurement enforced the capacity to combine both the dominant traditional structures—stone masonry and wooden frame—of Ottoman architecture. Coupled with the sense of logic and simple rationality and with the subtle feeling for the natural environment and the typological and hierarchic differentiation that permeated Ottoman architecture to the very end,²⁸ it compensated for the lack of refinement in Ottoman architectural theory. It is as if a measurement system had formed the intersection where the logic of the great masonry structures of the Romans crossed the modular logic of the wooden structures of the Far East. This is much more than a metaphor; it shows the traces that passing cultures had left in Anatolian and Balkan soil and that Byzantine and Islamic mysticism had only in part erased.²⁹

We must also consider the typological and conventional mentality of Ottoman designers that allowed the town or the single building, however varied and articulate, to be conceived as a combination of definite and easily recognizable elements and types. Technology and linguistic elements aggregated into modes (the central-cupola pyramid form, the functional standard combination of masonry vault and dome cells, the wood-frame grid of houses) that were each a compound of technological and semantic conventions, rather than mere technical or functional options. Much as a musical instrument would suggest a *makam* and channel artistic expression in a given direction, the technology language complex chosen by the architect would suggest specific solutions.³⁰ For example, wood techniques would bring about certain plastically fluent gable forms; brick masonry would easily fall back on Byzantine reminiscences (bull's-eye windows, nervous undulating cantilevers). These cultural conventions enabled the architects to design buildings with a mere outline of intent, as the more detailed effects would be "built in" in the mode and fashion of the epoch.

Despite its lack of complex drawing technique, but thanks to standard detailing conceptions and to the



1. Detail of plan of *çifte hamam* (Turkish bath with symmetrical sections for men and women). Topkapı Archives, E. 9495-7. Drawn on thick *rab'a* (15 × 15 mm. grid) paper, black-ink lines and red-paint infill. Half-*parmak* grid represents one *arşın* grid; hence scale is 1:48. Construction and layout date the drawing no later than the 17th century. Note realistic representation of masonry dimensions.



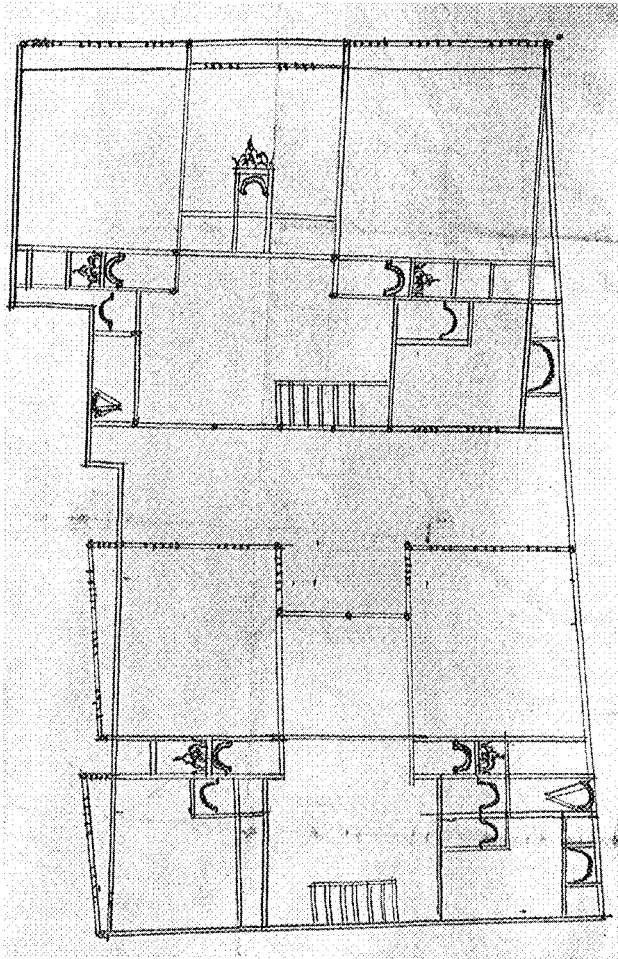
2. Detail of the plan of a large dwelling. Topkapı Archives E. 9495-9. Ink drawing on thick *rab'a* grid paper. Scale 1:48. Probably late-18th-century wood-frame construction. Walls are represented with a single line.

tradition of stonecutting, Ottoman architecture had an empirical and rational mentality that was reflected in its methods of design and composition. They were of a very simple nature from the point of view of architectural theory, but quite articulate when applied to building practice.

There are few pre-Western architectural drawings in the Topkapı archives or elsewhere. Those that exist mostly date no earlier than the seventeenth century. They are drawn on thick *rab'a* paper, which has a square grid lightly but quite visibly cut into it. The side of each of its squares represents one *arşın*. Plans are drawn on this grid using a very simple technique; doors and important openings are seen in horizontal projection. The *arşın* grid is clearly related to the regular dimensions and rhythm of the building elements. All drawings are functional. They are not embellished, but do carry notes addressed to the patron. Early drawings are careful and realistic in the rendering of masonry; later plans, though their ornamentation is elaborate, are more schematic because the width of walls is not always drawn to scale.³¹ Master-builder drawing

techniques remained essentially unchanged until the mid-nineteenth century. The masters of Bratzigovo in eighteenth- and nineteenth-century Bulgaria traced their plans directly on the site, which would sometimes result in harmonic relations and even in golden-rule proportions.³²

However logical this method of measurement, representation, and conception was for the building sites of the classical period, patrons did occasionally find it insufficient. The plastic forms of late Anatolian-Balkan architecture could not be depicted or measured without elaborate three-dimensional models. Chronicles and expense registers often report that "solid figures" (*mücessem resim*) had been made. Mahmut I was convinced by the design of the Nur-u-Osmaniye only after he had seen a model. Would they have been three-dimensional, as some have held? Mosque- or house-shaped pigeon houses on eighteenth-century façades and realistic fortress reliefs on eighteenth- and nineteenth-century fortress keys in the Topkapı Hazine collection suggest that there would have been no difficulty in finding artisans capable of



3. Plan of a wood-frame house. Topkapı Archives E. 9495-10. Note realistic thickness of walls and typical cantilever of rooms over basement wall. Probably earlier than plan in fig. 2.

building small-scale models. It is unfortunate and strange that not even one of them should have survived. In the second half of the nineteenth century the Bulgarian master builder Kolyo Ficev was commissioned by Mithat Paşa to design and build the bridge of Jantra. A few weeks after the commission he presented a wax model of the project.³³ Could this have been an Ottoman tradition?

Direct teaching from master to apprentice was the rule among both architects and *kalfas*,³⁴ but in the *hassa* institution regular lessons and the use of books were common. In the eighteenth century a new *ocak* was charged with the tuition of recruits for the main *ocak*. The teaching of practical skills was limited to carpen-

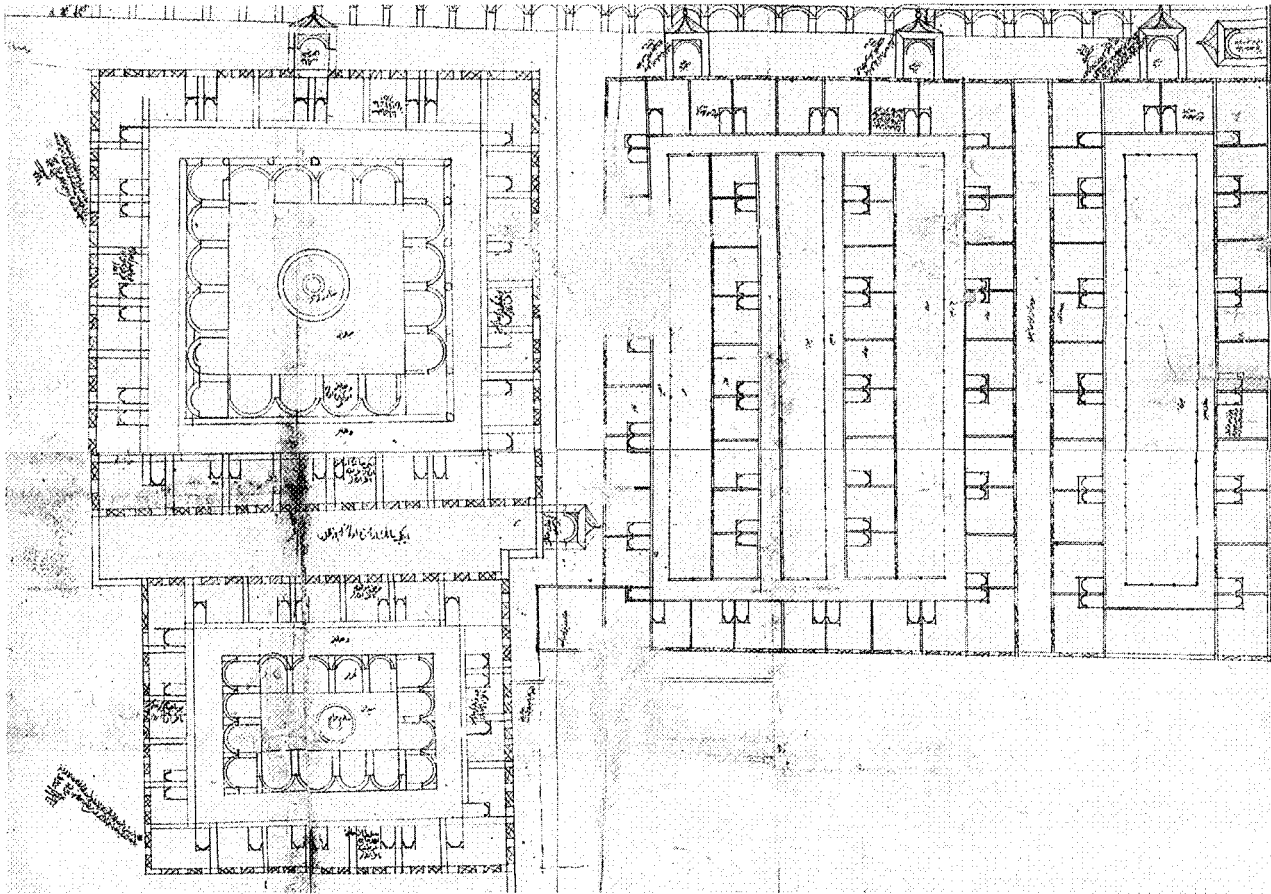
try, perhaps because a large number of apprentices came from families of stone masons and architects or had already had some masonry practice. In teaching, geometry (*hendese*) was connected to measurement (*zir'a ölçmek*) and proportions (*oran*).³⁵ There is no mention of drawing lessons; at the end of the eighteenth century in the military *hendese* school, trigonometry and freehand drawing of nature and of human figures were taught—but not to architects!³⁶

ARCHITECTURAL THEORY

It is not easy to link architecture to intellectual life in the Ottoman Empire. The Ottomans had no philosophical inquiry worth mentioning, and their theology was orthodox and conservative. As a result the various arts had no common theoretical basis to fall back on. Intellectual awareness was not absent in historiography, but it evolved on an empirical footing and by sectors, rather than on a speculative and humanistic base. Culture was heterogeneous and lacked the ideological and intellectual cement that could have bound together its corporate and ethnic diversity, and overcome the antagonisms between court, urban, and rural societies. Traditional production was partly suffocated and partly invigorated by the importing of new artistic and productive processes from the West.

Islamic studies can and do trace some analogies between medieval Islamic philosophy and aesthetics and post-medieval Islamic architecture,³⁷ but they tend to be farfetched and in the case of Ottoman architecture are certainly misplaced. It is in the nature of the complex creative processes of architecture that in the absence of very strong symbolic or iconographic evidence, one cannot demonstrate that they incorporated current mathematical or philosophical concepts. We have no proof at all that architects had developed sophisticated ideas similar to those of philosophers, or even of the more sophisticated travelers who described their work.

Did al-Farabi's mathematical concepts influence Islamic architecture? The complex geometric configuration of medieval ornamentation might perhaps suggest it, but I doubt that overall proportions of space and volume were derived from complex conceptual systems.³⁸ Theoreticians tend to overstate the importance of simple geometrical operations (the insertion of circles in squares, of geometrical figures in spheres, etc.). They are common in the trade's millenary tradi-



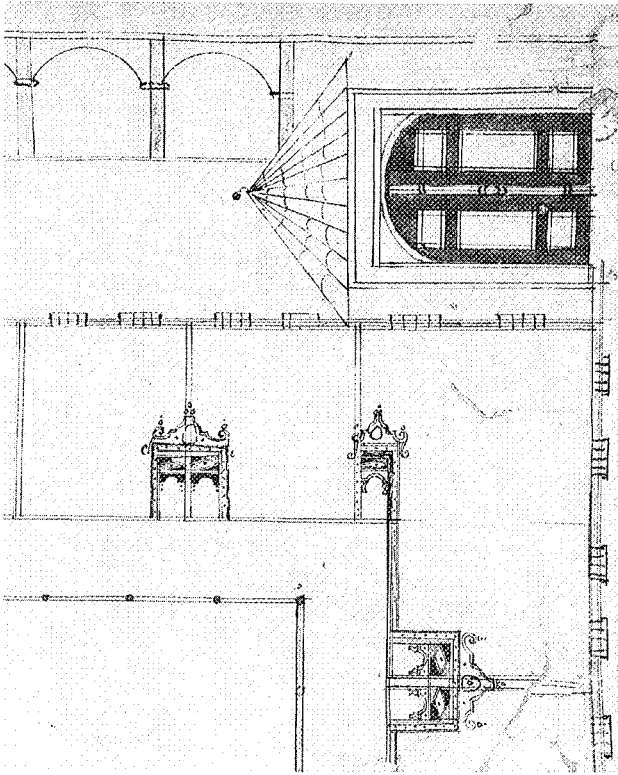
4. Ground-floor plan of a large complex with courts (part of Topkapı Palace?). Topkapı Archives E. 9495-6.

tion, but they have little to do with the distinctive quality of each individual work. The empirical roots of Anatolian building art and tradition must have ousted the tendency, if one existed, to transfer a general aesthetic hypothesis from philosophical inquiry to building practice.

Three factors might, however, contradict these assertions. The first is that the analysis of plans and elevations of buildings by Balkan masters has shown the existence of systems of proportions and tracing inscribed in circles and hence measurable only with irrational numbers.³⁹ But these are called up by the fundamentally empirical modular measurement systems as well as by the general rationality of Ottoman architectural practice. For example the use of long leather strips for measuring and tracing on site encouraged circle and diagonal tracing and hence irrational numbers (see figs. 7, 8).

The second is that Ottoman writers did pay lip service to theory and religious thought; but hyperbole and orthodox theological justification were often required for professional survival.

Finally, mysticism was indeed diffuse and syncretism with pre-Ottoman and pre-Christian traditions and lore may have induced some characteristic figures in plan and elevation and stimulated the predilection for certain rhythms. Did Sufi thought in the Ottoman version (*tasavvuf*) promulgated by the Dervish orders have any influence on architecture? It might seem so from certain circular or elliptical schemes that recur in the ceremonial halls (*meydan*) of Dervish tekkes or in the perfectly symmetrical cupola-buttress profiles which recur from Sinan's Selimiye to late-eighteenth-century mosques. It would also not be impossible to detect some parallelism between the Turkic-Asiatic non-plastic and position-determined distribution of, and feeling for,



5. A detail corresponding to the upper-right-hand corner of fig. 4 in a later version (probably end of the 18th century). Wall construction is less carefully drawn, but door frames and ornamentation are more elaborate. Topkapı Archives E. 9495-5.

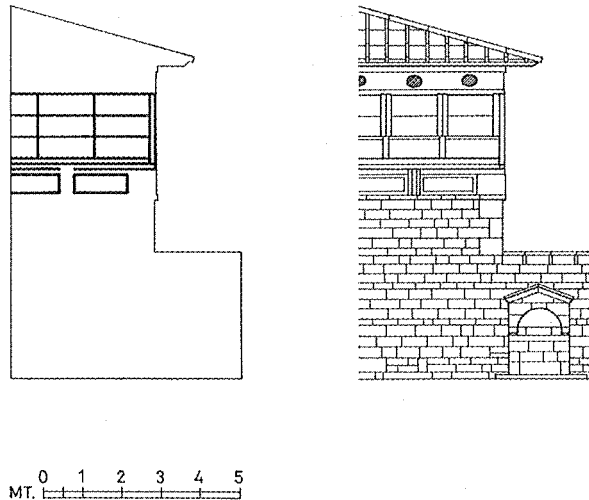
space that influenced Ottoman architecture and the symbolic distribution of objects and elements in the Bektashi meydan:⁴⁰ the hearth with a piece of firewood and incense, the red door sill (*kızıl eşik*) with a carafe of honey nectar, the throne with an oil lamp, the four privileged seats (one by the hearth, one by the door, two by the throne).

But this is really dangerous ground if it is not accompanied by a more thorough iconographic and typological comparison than has so far been carried out. As a matter of fact the antagonism of Aristotelian systematic aesthetics (nearer to Sunni anti-mysticism?) to Pythagorean and Platonic ideas (to which Sufi mystics are supposed to be more sympathetic) is no more than a metaphor when associated with art history and contains a sensible contradiction *in nuce*: Pythagorism and Platonism suggest simple proportions (intervals?) 1:2, 2:3, etc., which we usually associate

with rationality, whereas the more complex mathematics of medieval Arab and Central Asian thinkers (if they have effectively influenced architecture) induced proportions and spaces that have an algebraic (to use Massignon's expression) and an indefinite (or non-finite) quality. The mathematics of the subtle rhythm and proportions of medieval Arab and Byzantine architecture are algebraic because they are gradual in their change of dimension and interval. They determine a strong feeling of space by welding elements, each of which can be of not very precise dimensions or geometry, into a plastic unity and through long sequences of elements (for example, columns) which render less finite the margins of space.⁴¹ They also often show irrational numbers. Instead, the mathematics of Ottoman architecture (let us not forget, centuries later and in modern times) is arithmetic, that is, based on clear-cut, simple modules required both by aesthetic attitude and by building practice. "Rational" and "irrational" are adjectives that have quite different meanings when applied to architecture and to philosophical speculation; their association is confusing.

Architectural theory can be seriously examined only through texts that are directly pertinent to the process of architectural design. Two texts examined in recent essays emerge as very interesting documents: Cafer Ağa's *Risale-i Mimariyye* (seventeenth century) and Ahmet Efendi's *Tarih-i Cami-i Şerif-i Nur-i Osmani* (eighteenth century). The second deals at length with the construction of the Nur-u-Osmaniye mosque and is a very interesting document on Ottoman building history, but it does not touch any aspect of architectural theory.⁴² Cafer Ağa's work is more complete, even redundant.⁴³ It was written by Chief Architect Mehmet Ağa's secretary Cafer in the seventeenth century and deals mainly with Mehmet Ağa's life and works. The *Risale-i Mimariyye* with its cantos on the creation of the universe (which do contain some Sufi symbolism), its descriptions of the holy cities and of Mehmet Ağa's piousness would appear quite conventional if some moving strophes had not indirectly suggested an analogy between the Sultan Ahmet mosque's interior space and the universe that throws quite a new light on the whole poetical construction. A paean to God's creativity merges with praise to the Sultan Ahmet mosque:

What is this noble mosque? This place that bespeaks the unity of God? (What is this land of *tehlil*?) What are these high and mighty cupolas and these feasting lamps?



7. Proportions and modular grids in Ottoman wood-frame façades: detail of wooden inset in one façade of the Dervish tekke of Tetovo in Macedonia, built around 1770. Reconstruction by M. Cerasi and L. Spinelli.

uneasy about any complacent definition of Ottoman architecture's intellectual—as opposed to artisanal—background. Did Sinan, who had worked on the conversion of the Esztergom Cathedral in Hungary,⁴⁴ examine the Renaissance central-domed chapels existing in that town? When he abandoned the narrative and eclectic approach of his earlier work, to what extent was the theoretical basis of his architectural conceptions affected? Why was this influence activated decades after his trips to Central Europe?

Simyon Kalfa's Nur-u-Osmaniye mosque is equally puzzling, but for quite different reasons. Where does the mastery of the European Rococo-Baroque lexicon stem from? It is no rough quotation or mere imitation of foreign styles, but a clever transposition of a foreign vocabulary into a perfectly dominated indigenous poesis. This too implies more than mere artistic intuition, perhaps a historicistic approach of which we have no precise knowledge. Both cases strike us as possessing a conceptual clarity of design (as opposed to mere clarity of construction or simplicity of composition) exceptional in Ottoman culture and never to be repeated again.⁴⁵

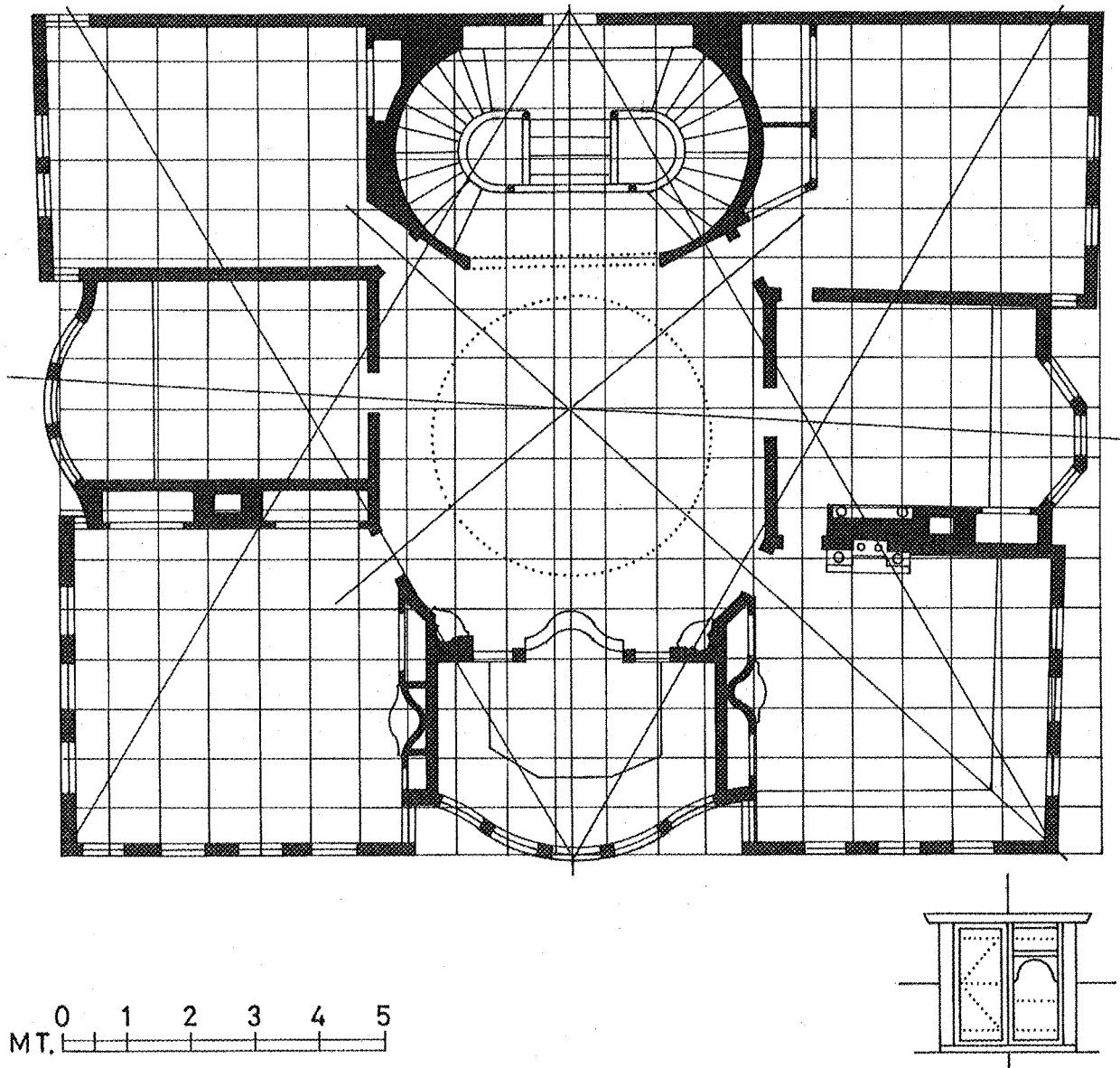
An uncomfortable conclusion, if any, could be that in Ottoman architectural culture some tentative approaches to theory (explicit in writing and implicit in some conceptually outstanding works) were attempted,

but that the general orthodoxy of intellectual life and the accent on technological rather than cultural reform had deprived these budding endeavors of their potential founthead—either Western thought in its completeness or Islamic thought creatively revised—and consequently of heirs. Sinan's masterpiece was not introduced by intense experimental and theoretical work as was Alberti's or Bach's, and it did not stimulate further speculation: it was not a link in a chain of sympathetic cultural events.⁴⁶ The chasm between the late Sinan's conceptual construction—no simple masterpiece, but the full expression of a culture's potentiality—and the reformist sultans' misjudgment about the necessity of reforming the *hassa* school two centuries later is a paradigm of the Ottoman cultural crisis. It is an uncomfortable (and intuitive) conclusion because before post-classical Ottoman architecture can be fully understood, the nature of that crisis and its effects on intellectual processes have to be sought off the well-beaten paths of research on institutional, economic, and technological underdevelopment.

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NOTES

1. Arabic *mimar* in Turkish and, according to Ami Boué, *La Turquie d'Europe* (Paris, 1840), vol. 3, p. 69, *neimar* among the Slavic subjects of the empire.
2. Robert Mantran, *Istanbul dans la seconde moitié du XVII^e siècle* (Paris, 1962), pp. 493-99.
3. Kasim Ağa, seventeenth-century chief architect, may have been an exception in his notoriously excessive passion for politics (see Ahmet Refik Altınay, *Türk Mimarıları* (Istanbul, 1980), pp. 73-83, but we have ample proof that many a chief architect was rich enough to donate religious buildings and powerful enough to have his own small court of scribes and helpers. Cafer Ağa, writer of the *Risale-i Mimariyye* (see Orhan Şaik Gökyay, "Risale-i Mimariyye—Mimar Mehmet Ağa—eserleri" in *Ismail Hakkı Uzunçarşılı'ya armağan* (Ankara, 1976), pp. 110-215, was the scribe, follower, and eulogist of Mehmet Ağa, the Sultan Ahmet mosque's architect.
4. For the *has mimarı*, see Altınay, *Türk Mimarıları*; Robert Anhegger, "Die Römerbrücke von Mostar: Ein Beitrag zur Geschichte und Organisation des Bauwesens im Osmanisches Reich," *Oriens* 7 (1954): 87-107; Ömer Lütfi Barkan, *Süleymaniye Cami ve İmareti İnsaatı 1550-1557* (Ankara, 1972), vol. 1, pp. 93-137; Mustafa Cezar, *Sanat'ta batıya açılış ve Osman Hamdi* (Istanbul, 1971), pp. 44-63; idem, *Typical Commercial Buildings of the Ottoman Classical Period and the Ottoman Construction System* (Istanbul, 1983), pp. 284-85; Muzafer Erdoğan, "Mimar Davud Ağa'nın hayatı ve eserleri," *Türkiyat Mecmuası*



8. Proportions, tracing, and axes of symmetry in a 19th-century house in Bulgaria. Plan redrawn on *arşın* grid. Lower-right-hand corner: built-in furniture and door. Redrawn from Ianko Stoikov, *L'architecture de Koprivchitsa* (Sofia, 1977).

12 (1955): 179-204; idem, *Lâle devri baş mimarı Kayseri'li Mehmed Ağa* (Istanbul, 1962), pp. 74-83. The organization was more Ottoman than Turkish because it was part of the imperial court which absorbed contributions from the entire empire. For the same reason it was the first link of the corporate and cultural chain in the building arts to break when the court was opened up to Western influence.

5. Cezar, *Sanat'la batıya*, p. 63.

6. For the conception of towns as an aggregate of autonomous

foundations (*imaret* and *mahalle*), see Maurice Cerasi, "Il concetto di fondazione nella città Ottomana" in *Storia Urbana* 31 (1985): 31-56.

7. Léandre Vranoussis ("Les Grecs de Constantinople et la vie intellectuelle à l'âge des Drogmans," in *Acts of the 1973 Association Internationale du Sud-est Européen Conference in Istanbul* (Bucarest, 1977), pp. 133-41, on the "Orientalism" of modernist Greek intellectuals in the eighteenth and nineteenth centuries.

8. Bernard Lewis, *The Emergence of Modern Turkey* (London, 1961), p. 35.
9. Cengiz Orhonlu, *Osmanlı İmparatorluğunda Şehircilik ve Ulaşım üzerine araştırmalar* (İzmir, 1984); see chapter 1, pp. 1-26, on town architects.
10. This is the case of Ottoman-ruled Hungarian towns in the seventeenth century. According to Gyözö Gerö, "The Question of School and Master in the Study of the History of Muslim Architecture in Hungary," in *The Muslim East: Studies in Honour of Julius Germanus* (Budapest, 1974), pp. 189-99, most garrison towns had a *mimar* mentioned by Evliya Çelebi, but local non-Ottoman master builders and architects rarely took part in important building activity.
11. For Balkan master builders, see Nikolos K. Moutsopoulos, *Koudaroi Makedones kai Ipeirotes Maistores* (Athens, 1976), for Epirus and northern Greece; Krum Tomovski, "Master-Builders Andrea Damjanov 1813-1878," in *Macedonian Review* 2 (1973): 176-78, on the Macedonian Damianov family; Nikolai Todorov, *Kolio Fitcheto* (Sofia, 1966); and Ianko Stoikov, *Maistor Aleksii i Maistor Kolio Ficeto* (Sofia, 1977), on the Bulgarian Ficev family; Peio Berbenliev and V. H. Partacev, *Bratizgovskite maistori stroiteli prez XVIII i XIX vek i tiahnoto arhitekturno tvorcestvo* (Sofia, 1963), on the Bratizgovo masters; Emin Riza, "Traits de la création populaire dans l'habitation urbaine albanaise," in *Monumentet* 2 (1982): 21-27; Anhegger, "Die Römerbrücke," p. 88, and Machiel Kiel, "Some Reflections on the Origins of Provincial Tendencies in the Ottoman Architecture of the Balkans," in *Islam in the Balkans: Persian Art and Culture of the 18th and 19th centuries*, ed. Jennifer M. Scarce (Edinburgh, 1979), pp. 19-28, mention Albanian masters.
12. Moutsopoulos, *Koudaroi*, passim.
13. In the second half of the nineteenth century, Master Ficev could neither read nor write (Stoikov, *Maistor Aleksii i Maistor Kolio Ficev*, passim; Felix Kanitz, *La Bulgarie danubienne et le Balkan: études de voyages 1860-1880* (Paris, 1882).
14. In Sinan, East Anatolian, Syrian, and Mamluk masonry and wall composition coexist with Adriatic-Dalmatian proportional equilibrium, paleo-Christian and almost Renaissance central-cupola space schemes (and I would add, if I were certain of the attribution of the small İvaz Efendi mosque in Istanbul, experimentation with a main cupola encircled by minor elements in a nervous and complex volume composition very similar to late-Byzantine motifs). In Mehmet Tahir (chief imperial architect from sometime before 1745 to 1780; see L. A. Mayer, *Islamic Architects and Their Works* [Geneva, 1956], p. 104), at his best, the borrowed elements are not more numerous (classical composition techniques, dense rhythm of vertical elements and masonry which recall Byzantine schemes, European Rococo ornamentation and volume fusion, episodic collage of different building types and elements much in the seventeenth-century Ottoman tradition); his outstanding works are no less successful than Sinan's in reaching a comprehensible and fine architectural statement. Mehmet Tahir and Simyon Kalfa (very probably architect of the Nur-u-Osmaniye mosque, certainly responsible for the building site) are nearer to Sinan than they are to their European Rococo contemporaries. The structure of their language and poesis shows that they would not have significantly reduced the distance between them and European architectural semantics, even if their patrons had allowed them to experiment more freely with Western types than they did.
15. See L. A. Mayer, *Islamic Woodcarvers and Their Works* (Geneva, 1958). In one drawing of Siyah-Qalam (plate 60 in Mazhar S. İpşiroğlu, *Siyah Qalem* [Graz, 1976], carpenters on a building site are using a number of carpenters' tools, not all identifiable.
16. Nikolai Todorov, *The Balkan City, 1400-1900* (Seattle and London, 1983); Suraiya Faroqhi, *Towns and Townsmen of Ottoman Anatolia: Trade, Crafts and Food Production in an Urban Setting, 1520-1650* (Cambridge, 1984), pp. 280-81. The only mention in Faroqhi concerns traveling groups. The names of certain Turkish and Armenian master builder and mason families recur over long periods (Metin Sözen, preface to Altınay Türk Mimarları, p. 12. Also Kevork Pamukçuyan, "Balyan" in *İstanbul Ansiklopedisi*, vol. 4, fasc. 46 (Istanbul, 1960), discussing the origins of the Balyan dynasty of Armenian architects who worked for the sultans at the end of the eighteenth century and throughout the nineteenth, reports that in Bali, their home village in the Maraş district in southeastern Anatolia, as far back as 1683 the village *muhtar* had married a daughter of the chief architect and had become chief architect himself, suggesting that the village had a remarkable tradition of training architects. Perhaps the prestige of Ottoman architects has distracted historians from systematic research on Anatolian master builders. We do not know if they worked singly and in small family groups or if they also constituted large village brigades, as they did in the Balkans.
17. See Bernard Lewis, *The Muslim Discovery of Europe* (London, 1982), pp. 223-30.
18. Undercurrents of Islamic influence that have not yet been fully investigated were active in the Balkans long before the Ottomans. See André Grabar, *Recherches sur les influences orientales dans l'art balkanique* (Paris, 1928), passim. See also *The Mutual Effects of the Islamic and Judeo-Christian Worlds: The East European Pattern*, ed. A. Ascher, T. Halasi-Kun, and B. K. Kiraly (New York, 1979), pp. 149-66, passim.
19. Barkan, *Süleymaniye*, passim; Kiel, "Some Reflections," pp. 19-28; Pia Hochhut, *Die Moschee Nuruosmaniye in Istanbul: Beiträge zur Baugeschichte nach osmanischen Quellen* (Berlin, 1986), p. 24.
20. Georgios A. Megas, *Die Ballade von der Arta-brücke* (Salonika, 1976), p. 66.
21. Kirkor the first of the Armenian Balyan dynasty of imperial architects, was capable of very fine combinations of Western and Ottoman elements, as seen, for example, in the imperial mint of Topkapı. Loss of identity came much later. See also Pamukçuyan, "Balyan," and Pars Tuğlacı, *Osmanlı mimarlığında batılılaşma dönemi ve Balyan ailesi* (Istanbul, 1981), passim.
22. Günsel Renda, *Batılılaşma döneminde Türk Resim Sanatı 1700-1850* (Ankara, 1977), pp. 189-91 and passim. See also Ayda Arel, *Onsekizinci Yüzyıl İstanbul Mimarisinde batılılaşma süreci* (Istanbul, 1975), passim.
23. This can be seen, for example, in the simple brickwork of por-ticos in the minor Mount Athos monasteries such as the Pantokrator, and in the simple cubic cupola-supporting walls of the Bigorski Monastery in northern Macedonia. See also A. K. Orlandos, *Monastiriaki arhitektoniki* (Athens, [1926]), passim, and A. K. Orlandos, "L'architecture religieuse en Grèce pendant la domination turque," in *L'Hellénisme contemporain* (Athens, 1953), pp. 179-91, for building elements very similar to Ottoman functional architecture used in Orthodox convents.
24. Barkan, *Süleymaniye*.
25. Doğan Kuban, "Notes on Building Technology in the Eigh-

- teenth Century: The Building of the Mosque Nuruosmaniye at Istanbul according to "Tarih-i Cami-i Şerif-i Nur-ê-Osmanî, I," *International Congress on the History of Turkish-Islamic Science and Technology* (Istanbul, 1981), and Hochhut, *Die Moschee Nuruosmaniye*.
26. The pre-Islamic stone masonry of Anatolia was even more brilliant. In the area of Binbir Kilise, stones have been found dozens of miles away that are perfectly cut for church building sites.
 27. Celal Esad Arseven, *Türk sanatı tarihi* (Istanbul, n.d.); Behçet Ünsal, "Topkapı Sarayı Arşivinde bulunan mimarî planlar üzerine," in *Türk Sanatı Araştırma ve İncelemeleri*, vol. 1 (Istanbul, 1963), p. 169.
 28. For the opposition of geometric to naturalistic design in building and urban layouts in late Ottoman architecture, see Maurice Cerasi, "Il tessuto residenziale della città Ottomana (secc. XVII-XIX)" in *Storia della Città*, vols. 31-32 (Milan, 1984), pp. 31-34 and 47-56, and idem, "Open Space, Water and Trees in Ottoman Urban Culture in the XVIIIth-XIXth Centuries," in *Environmental Design* 2 (1985): 36-37 and 40-43. See also my forthcoming book, *L'architettura della Città Ottomana, 1690-1831*.
 29. Anatolia is the intersection for many building and spatial mentalities. The opposition, for example, of the Arab and Byzantine "algebraic" mentality to the "arithmetical" simplicity of the Ottomans (which should not be overstated, but it does exist) can be explained by the interaction of many spatial and typological heterogeneous factors such as the Central Asian conceptions and centuries-old Anatolian building traditions. This interaction was rendered possible by the Ottoman tendency to exploit, centralize, and unite all provincial resources. It diverted the flow of Islamic culture (as well as that of the Christian minorities) either into old channels which had been abandoned or into new ones. Take Strzygowski's (*Asiens bildende Kunst* [August, 1930], pp. 55 and 143) farfetched but nonetheless too complacently rejected theory of the contradiction between the family or group art of central and eastern Asia expressed in wooden structures and the art of "power" in Mesopotamia and the Mediterranean, seen at its best in masonry and monumental cupola structures. In this light the pyramid-form mode of imperial mosques and the pavilion-like houses and palaces are not contradictory, but point to the intercourse of different aesthetic and ideological concepts. The analogies should not be taken at face value, but they do provide insight into the mechanisms and specific context of the Anatolian cultures. Another example is the distinction Richard Krautheimer makes (*Early Christian and Byzantine Architecture* [London, 1965]) between the avant-garde subtleties of Saint Sophia and the "standard" architecture of the same period, both belonging to the same Anatolian-Macedonian cultural geography, but in opposite schools of thought. One can draw an analogy between that distinction and the contrast between the revolutionary and complex designs of the Selimiye and Nur-u-Osmaniye mosques and established current Ottoman building practice. History, even Anatolian history, does not repeat itself, but art sometimes runs into old grooves with no loss to its progressive character.
 30. See Cerasi, *L'architettura della Città Ottomana*, chap. 12.
 31. Good examples for comparative study are figures 1-5. Figure 1, probably the earliest, is the plan of a Turkish bath, fairly well drawn in black ink with red infill of the walls, which are represented in their full width. Two plans obviously represent the same building (a court complex in Topkapı?), the later figure dating probably from the second half of the eighteenth century, if we can judge from the door-frame ornaments; it contradicts in some details the more careful first version.
 32. I owe Dr. Anna Roskovska, Sofia, the courtesy of having indicated and made available *hermeneia* (iconographical and ornamental standard models) used by icon painters and architects in the Christian Orthodox world. See Anna Roskovska, "Neofit Rilski: avtor na arhitekturni proekti," in *SP. Arhitektura* 5 (1975), p. 35, for the drawings of a school building in Panaguriste by the monk-artist Neofit Rilski (active 1840-60). These drawings are similar to figure 5. I also wish to thank Professor Berbenliev, Sofia, for describing to me the working methods of the master builders of Bratizgovo (see Berbenliev and Partacev, *Bratizgovskite maistori*) and other Macedonian and Bulgarian regions.
 33. Kanitz, *La Bulgare danubienne*.
 34. Sözen (preface to Altınay, *Türk Mimarları*) plausibly holds that learning the trade was extremely slow because the future master had to show skill in such a variety of crafts, including carpentry, masonry, and stone-cutting.
 35. Cafer Ağa (see below, n. 43) indulges in a meticulous description of building terms, units of measure, and auxiliary crafts, but he does not describe drawing techniques.
 36. Cezar, *Sanatta batıya*, p. 16.
 37. Cf. Nader Ardalan and Laleh Bakhtiar, *The Sense of Unity: The Sufi Tradition in Persian Architecture* (Chicago and London, 1973); Roland Pietsch, "Spiritual and Cosmological Reflection in the Spatial Conceptions of Islamic Art," *Islamic Quarterly* 26:2 (1982). I have indirect notice that a Soviet scholar, Dr. Bulatov, is studying practice and theory in medieval Central Asian Islamic architecture and I have read only a partial translation of one of his important chapters on theory and proportions (M. S. Bulatov, *Geometriskaja Armonizatsia v Arhitekture Srednei Asii IX-XV vv.* [Moscow, 1978]).
 38. I find J. J. Coulton, *Greek Architects at Work: Problems of Structure and Design* (London, 1977), p. 65, quite convincing in his statement that Greek architecture does not show subtle and irrational ratios, but that simple arithmetic relationship, with many exceptions and irregularities, prevail in it and that architects usually regarded rules of proportion "in a prosaic light."
 39. See figs. 7 and 8 and n. 32.
 40. The term *meydan* in Mehmet Zeki Pakalın, *Osmanlı Tarih Deyimleri ve Terimleri sözlüğü* (Istanbul, 1946). In various essays I have dealt with this aspect of Turkish-Ottoman spatiality, which contrasts strongly with Christian and Muslim Mediterranean plasticity. See Cerasi, *L'architettura della Città Ottomana*, chaps. 11 and 13.
 41. A good example is the Court of Lions in the Alhambra, where I have found very complex intercolumnar measures and intervals that form subtle but coherent rhythms.
 42. Kuban, "Notes on Building Technology," and Hochhut, *Die Moschee Nuruosmaniye*.
 43. Orhan Şaik Gökyay, *Risale-i Mimariyye*, contains long extracts and a complete description of the *Risale*.
 44. Gerö, "The Question of School."
 45. Early Western neoclassicism was noticed, but it did not find sufficiently fertile soil in which its more progressive aspects could germinate. It was superficially accepted as a style. It put down deeper roots in the Vatepediou Monastery on Mount Athos, in the Ahmet III Library, and in the Sofa Köşk of the Topkapı

Palace. (I am aware that not all would classify these three structures as neoclassical, but they were deeply influenced by Western currents that were not all Rococo.) The recourse to the classical orders or to vertical elements and well-modulated rhythms responded to the pervading nostalgia of Ottoman and Greek Orthodox circles for the lost sense of order and again called up the sense of hierarchy that had characterized a great deal of Ottoman and Byzantine monumental architecture. It

took the place of something which, it was felt, had been lost. In no way was it revolutionary.

46. Works primarily structured using geometric and typological theories are rare even in Renaissance and post-Renaissance Western art. The Selimiye mosque summarized the principles of precedent craftsmanship, just as Alberti's work and Bach's *Art of the Fugue* did, pushing those principles to the highest levels of abstraction and converting them into absolute statements.